LOW ENERGY LEVELS IN ^{111,113}Sb POPULATED VIA β-DECAY OF ^{111,113}Te

J. Shergur,[a,b] D. Seweryniak,[b] W. B. Walters,[a] A. Woehr,[c] P. Boutachkov,[c] C. N. Davids,[b] I. Dillmann,[d,e] G. Mukherjee,[b] S. Sinha,[b] A. Teymurazyan,[c] and I. Zartova[c]

[a] *Department of Chemistry, University of Maryland, College Park, Maryland, 20742*
[b] *Physics Division, Argonne National Laboratory, Argonne, Illinois 60439*
[c] *Department of Physics, University of Notre Dame, Notre Dame, Indiana 46556*
[d] *Institut für Kernchemie, Universität Mainz, D-55128 Mainz, Germany*
[e] *Departement für Physik und Astronomie, Universität Basel, Basel, Switzerland*

The structure of the odd-A Sb nuclides has attracted interest over the years mainly because their low-energy, low-spin states involve the coupling of the single Sb proton with the adjacent Sn core.[1] Specifically, the neutron deficient odd-A Sb isotopes provide an important testing ground for shell model calculations based on the heaviest self-conjugate double magic nucleus, ^{100}Sn. Above the A = 113 region, odd Sb isotopes have been described well by particle-phonon coupling using the Interacting Boson-Fermion Model (IBFM).[2,3] As such, Sb nuclei in the region of A~111-113 then provide an ideal place to map the model spaces of both approaches and to compare their predictive power.

Our experiment was performed at the Argonne Tandem Linear Accelerator System (ATLAS). The parent ^{111,113}Te nuclides were produced using a fusion-evaporation reaction of a beam of 225-MeV ^{56}Fe ions on targets of ^{60,62}Ni. All of the Te recoils were produced through the 2pn reaction channel. Recoils were then implanted on an aluminum tape that was then moved to a four HpGe detector array. Transitions between states in ^{111,113}Sb were identified by using time-gated γ-spectra and by taking coincidence gates on previously reported γ rays.

The focus of this paper is to report on the extended decay scheme of ^{113}Te, as well as to discuss the J^{π} of a previously ambiguous 1018-keV state in ^{113}Sb. In addition, a new low-spin ^{111}Sb level scheme will be presented that accounts for the $d_{5/2}$ and $g_{7/2}$ single particle excitations and the states that result from their coupling to the 2^+ phonon of the adjacent ^{110}Sn core. Experimental results will be discussed in the context of the IBFM and level systematics.

[1] G. Van den Berghe and K. Heyde, Nucl. Phys. **A163**, 478 (1971).
[2] Yu N. Lobach and D. Bucurescu, Phys. Rev. C **58**, 1515 (1998).
[3] Yu N. Lobach and D. Bucurescu, Phys. Rev. C **57**, 2880 (1998).